A STUDY OF YOGA PRACTICES ON SELECTED PHYSIOLOGICAL AND PSYCHOLOGICAL VARIABLES AMONG EARLY ADULTHOOD HYPOTHYROIDISM DISORDER WOMEN

A SYNOPSIS

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BONAFIDE CERTIFICATE

This is to certify that this synopsis of the thesis titled **"A STUDY OF YOGA PRACTICES ON SELECTED PHYSIOLOGICAL AND PSYCHOLOGICAL VARIABLES AMONG EARLY ADULTHOOD HYPOTHYROIDISM DISORDER WOMEN"** is the bonafide work of **"MOHANAPRIYA P" (Registration No.: 222909003)** towards the fulfillment of the requirements for the award of the Doctor of Philosophy.

It is certified further that the work reported herein is the genuine and original work based on the results of the experiments and investigations carried out independently by the scholar during the period of study under my guidance and supervision.

This work submitted for consideration is original and does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion.

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I **"MOHANAPRIYA P" (Registration No.:222909003)"** declare that this synopsis of the thesis titled **"A STUDY OF YOGA PRACTICES ON SELECTED PHYSIOLOGICAL AND PSYCHOLOGIICAL VARIABLES AMONG EARLY ADULTHOOD HYPOTHYROIDISM DISORDER WOMEN"** is the research work carried out by me under the guidance and supervision of **"DR. K. DESIGAMANI PROFESSOR OF BIO CHEMISTRY"** and this research work submitted for consideration is original and does not form part of any other thesis or dissertation on the basis of which a degree or award was conferred on an earlier occasion.

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ABSTRACT

Hypothyroidism, a common endocrine disorder, disrupts physical and psychological health in women, often presenting with weight gain, high TSH, hypertension, depression, anxiety, stress, and reduced self-esteem. This study examined the effects of yoga on young adult women with hypothyroidism. Using a quasi-experimental pre–post control design, 60 women aged 20–39 years were randomly assigned to an experimental group (n = 30) and a control group (n = 30). The experimental group participated in a structured 16-week yoga program that included asana, pranayama, meditation, and relaxation, practiced six days a week. The control group maintained routine activities without structured exercise. Parameters that were measured were BMI, blood pressure, thyroid hormones (T3, T4, TSH), and psychological variables (depression, anxiety, stress, self-esteem). The statistical analysis (paired t-test, ANOVA) demonstrated significant changes in the experimental group, including a low TSH, the body mass index, blood pressure, depression, anxiety and stress as well as improvements in self-esteem. The T4 levels were positively moving, whereas T3 levels were stable. These results indicate that yoga can be used as a useful, complementary intervention to deal with hypothyroidism and the overall quality of life of women.

Key Words: Yoga, Hypothyroidism, Depression, Anxiety, TSH, Self-Esteem, Early Adulthood Women.

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1. INTRODUCTION

The thyroid is a bilobed shaped endocrine gland that is found at the anterior neck that takes the responsibility of producing two hormones as triiodothyronine (T3) and thyroxine (T4) [1]. Thyroid hormones are very anchored in homeostasis since they regulate the body metabolism procedures, growth and the body energy balance [2]. Hypothyroidism is a state of hormonal inadequacy as a result of diminished thyroid synthesis of thyroxine (T4) and triiodothyronine (T3). It could be due to failure of the thyroid gland termed primary hypothyroidism that is observed in 99 percent of all hypothyroid cases or failure to stimulate the thyroid due to the hypothalamus or pituitary that is known as central hypothyroidism that is about one percent [3]. Inadequate iodine, thyroidectomy, or removal of thyroid gland, autoimmune etiology including hashimoto thyroiditis, post partum thyroiditis, radioiodine ablation and certain medications including amiodarone and lithium are the major causes of hypothyroidism. The presentation can vary between individuals [4]. In India, thyroid disorders affect approximately 42 million individuals, with hypothyroidism. An estimated 2% to 5% of people in the general population are affected [5]. The insufficiency of dietary iodine continues to be a major contributor to the worldwide incidence of thyroid dysfunction, while in India, autoimmune thyroiditis is emerging as a significant cause. This reflects a shift in risk factors compared to earlier decades [6]. Additional established risk factors include pregnancy, advanced age, and a genetic predisposition to thyroid disorders [7]. Women exhibit a higher prevalence of thyroid disorders, with a marked increase in incidence observed after the age of 60. Risk factors include autoimmune diseases, family history, iodine deficiency, and radiation exposure. Patients diagnosed with premature ovarian insufficiency face a significantly greater likelihood of developing autoimmune disorders of the thyroid [8].

YOGA

Originating in ancient India over five millennia ago, yoga is a holistic discipline that synergizes the mind and body through the practiced integration of postures (asanas), breath control (pranayama), and meditation to foster comprehensive well-being [9]. Beyond improving flexibility, strength, and relaxation, yoga is now widely recognized for its therapeutic role in managing chronic diseases, including endocrine disorders like hypothyroidism. Research suggests regular yoga can help regulate hormonal imbalances, enhance metabolism, lower stress levels and enhance general well-being. Therefore, yoga is increasingly being integrated as a supportive therapy for individuals with thyroid dysfunction [10].

1.1 NECESSARY OF THE STUDY

- One percent of people out of ten percent are affected by hypothyroidism in women (NIE).
- The overall prevalence of hypothyroidism was **10.95% [5]**.
- Young adults face difficulties with thyroid disorders, so they are faced with some complications at a younger age, like
  - Infertility
  - Vision problem
  - Miscarriage
  - Premature baby
  - Weight gain
  - Depression
- The intention of this study indicates that yoga is very important & needed for this society.

- Through yoga practices have given a solution and precautions for the problem have been given.

1.2 OBJECTIVES

- To establish baseline and endpoint values for key physiological and psychological parameters in both the yoga intervention and control groups, comprising women in early adulthood with a hypothyroidism diagnosis.
- To evaluate the efficacy of a structured yoga intervention in effecting change in selected physiological and psychological metrics among young adult women with hypothyroidism.
- To compare the differential outcomes in all measured variables between the experimental (yoga) group and the control group following the intervention period.
- To examine correlational relationships between pre-test and post-test measurements across all study variables within and between the intervention and control cohorts.
- To investigate potential associations between baseline clinical parameters and relevant demographic characteristics of the participant sample.

1.3 HYPOTHESIS

H1: It is hypothesized that the group receiving the yoga intervention will show statistically significant improvements in physiological (TSH, BMI, blood pressure) and psychological (depression, anxiety, stress, self-esteem) outcomes compared to the control group.

H2: A significant difference is expected in the post-intervention means of all study variables between the experimental and control groups.

H3: Significant correlations are predicted between the pre-test and post-test scores of the study variables within the experimental group.

H4: Significant associations are anticipated between specific socio-demographic variables and the baseline (pre-test) values of the clinical study variables

1.4 INCLUSION BENCHMARK

- Participants were willing to participate in the 16-week yoga intervention program.
- Women aged 20 to 39 years with a clinically diagnosed hypothyroidism.
- Thyroxine drugs also consume people's attention in this study.
- Hypothyroid women who do not practice yoga or any other form of physical exercise.

1.5 EXCLUSION BENCHMARK

- Subjects who recently underwent surgery in general or related to thyroid disorders.
- Patient's history will not be considered.
- Hypothyroid women with serious psychiatric illness, thyroid cancer, or thyroid nodules will not be considered.
- Pregnant women will not be considered in this study.

2. REVIEW OF RELATED LITERATURE

Varne & Balaji (2023). Investigated for this research examined the impact of a combined yoga and pranayama regimen on key biomarkers-including serum adipokines, Lipoprotein(a), thyrotropin (TSH), and blood pressure obese hypertensive patients with comorbid hypothyroidism. Participants engaged in a structured yoga and pranayama program in addition to standard medical care. Post- intervention analysis showed significant reductions in TSH and blood pressure, along with favorable changes in adipokine profiles and Lipoprotein(a) levels. These results suggest improvements in endocrine function, cardiovascular health, and metabolic balance. The authors concluded that integrating yoga and pranayama into standard treatment can provide additional therapeutic benefits for obese hypothyroid individuals with hypertension, recommending further large-scale studies for validation [11].

Rani et al. (2021). Analyzed effects of 3-month of combined yoga intervention on depression and their related health outcomes among women with hypothyroidism, a disease that is prevalent in most Indian women at 15.8%. Among 198 pre-intervention participants, 38 went through with the intervention; this consisted of 5 days in a week of 60 minutes of practising postures, breathing exercises, and other relaxation methods. The baseline and post-intervention measurements included depression, TSH, lipid profile, BMI, fatigue, anxiety, and stress. The results showed significant changes, and depression, TSH, BMI, fatigue, anxiety, and stress decreased significantly, whereas the HDL cholesterol increased significantly ($p < 0.05$). The researchers concluded that the consistent yoga practice (integrated) can significantly enhance mental health and the chosen physiological results among hypothyroid women [12].

Nilakanthan S et al (2016). This paper examined how high-intensity yoga program impacts lipid metabolism, dosage level of required thyroxine, and serum thyroid-stimulating hormone (TSH) in hypothyroid females. The participants of the

study were a total of 22 participants of 30-40 years old, household women. The duration of the training was 6 months and the sessions were held every week with each session taking four days. Each session was for 60 minutes. The analysis of the data was done in the ' ''t' test and the Wilcoxon signed rank test. This research has indicated that yoga practices have worked better in the reduction of weight, depression, and dyslipidemia, and stabilizing the autonomic nervous system. The object of the research on the current six-month history of the past practices of yoga can prove highly beneficial and complementing lipid profiles, TSH levels, which can be used to reduce the amount of thyroxine women require [13].

3. METHODOLOGY

The Yoga for Hypothyroidism Study adopted a quasi-experimental design, which involved the use of pre- and post-intervention measures on both the actively managed group and control group. The purpose of this study was to determine how a program of yoga affects certain physiological and psychological indicators in women with a history of hypothyroidism in the early adulthood. The population of the study was women with the age between 20 and 39 years with a diagnosis of hypothyroidism. The individuals who met the predefined inclusion and exclusion criteria were screened to be eligible participants. Afterwards, they were selected at random to belong to one of two groups: Experimental Group or Control Group, by use of a random sampling process. The Experimental Group was subjected to organized 16 weeks yoga intervention program, performed five days a week with the inclusion of particular Asana, Pranayama, and Relaxation. The control group was instructed to continue with their regular routine and did not need to include yoga and some new type of intended physical activity within the time of intervention. All the participants were subjected to baseline (pre-test) tests on physiological and psychological variables. Physiological variables were T3, T4 and TSH, which were measured with the help of a 3ml of a venous blood sample, TSH and blood pressure, which were measured with a BP device and a digital weight balance respectively. In order to perform psychological assessment, Depression Anxiety Stress Scale (DASS) questionnaire and the Rosenberg Self-Esteem Scale were used. After the completion of the 16-week yoga program, post-test assessments were conducted across all selected variables for both groups. The aim was to analyze the impact of yoga practices in improving physiological balance and enhancing psychological well-being among women with hypothyroidism. Ethical approval for this study was granted by the Institutional Human Ethics Committee (IHEC) (MAHER/IEC/PhD/34/FEB24).

3.1 Independent variables

- Yoga practices

3.2 Dependent variables

3.2.1 Physiological variable

- Blood pressure (BP)
- BMI (Body mass index)
- T3 & T4
- TSH

3.2.2 Psychological variables

- Depression
- Anxiety
- Stress
- Self-esteem

CONSORT FLOW CHART

ANALYSIS PLANNING

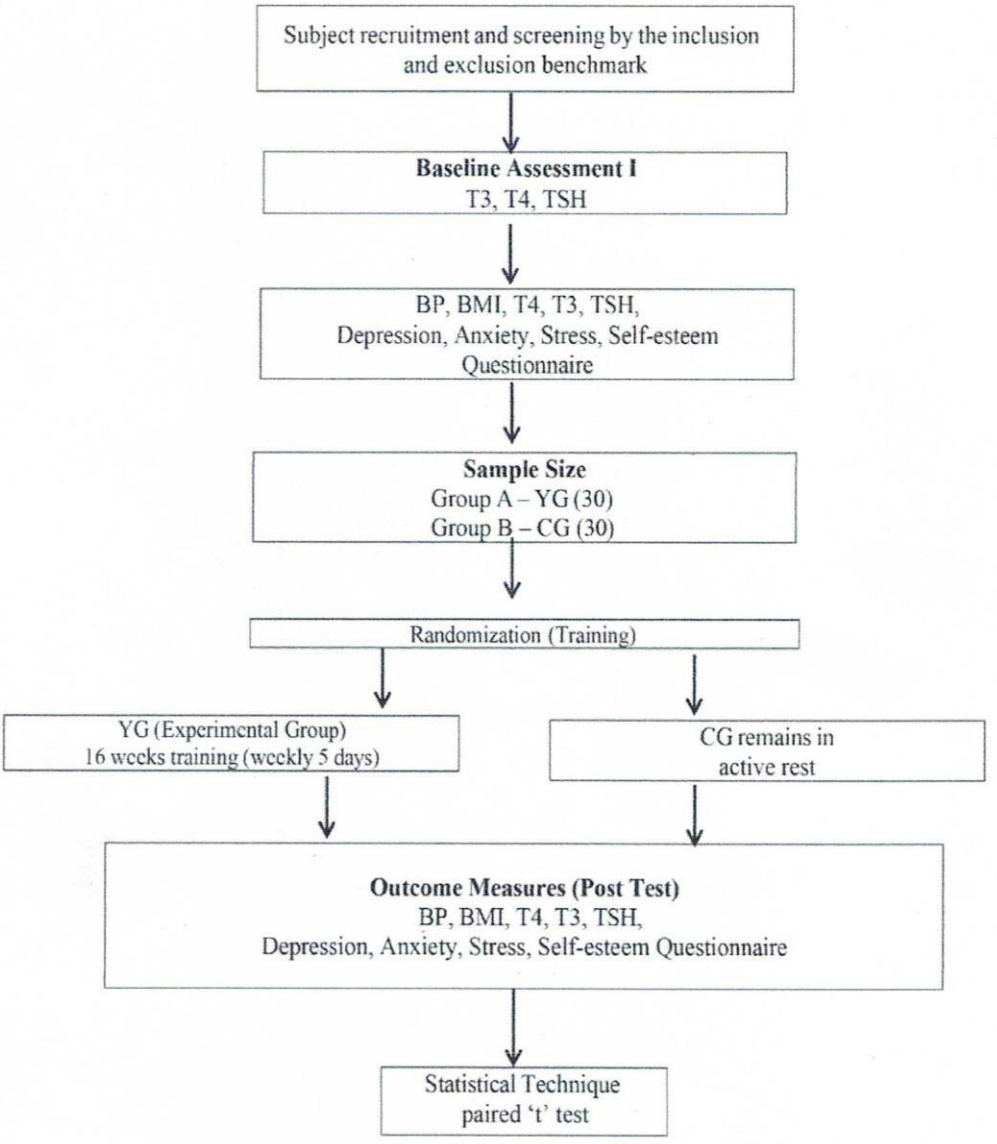

Figure 1 consort flow chart

3.3 INTERVENTION

The total study duration was four months (16 weeks). The experimental group underwent a structured yoga intervention. following the random division of participants into two groups, the control group was assigned to active rest without any specific physical or yogic practices. The experimental group underwent daily yoga sessions for one hour per day, six days in a week. The intervention involved gradual integration of yoga poses, pranayama and relaxation methods to enhance physiological and psychological parameters related to hypothyroidism. The control group did not attend yoga or organized exercise as their normal lifestyle. The design allowed providing a comparative evaluation of the impact of yoga on the variables of interest in the early adulthood of women with hypothyroidism.

Table 1: It describes the Training Program of the Yoga Practices

S.NO	LIST OF PRACTICES	DURATION
1.	Pranava mantra (AUM)	2 min
2.	Starting prayer	1 min
3.	Loosening exercise	10 min
4.	Surya namaskar	6 min
5.	Asanas	18 min
6.	Pranayama	5 min
7.	Meditation	16 min
8.	Pranava mantra (AUM) & Ending prayer	2 min

3.4 STATISTICAL TECHNIQUE

Data were summarized using descriptive statistics, presented as mean standard deviation. A paired t-test assessed the effectiveness of the intervention, while the Pearson correlation examined relationships among variables. Independent t-test and ANOVA were used to explore associations between study variables and demographic factors. A significant level of $p < 0.05$ was applied.

4. RESULTS

Table 2: A Comparative Analysis of Physiological and Psychological Variables in Young Women with Hypothyroidism.

Study variables	Yoga (n=30)		Control (n=30)		t test value and p value
	Effective value		Effective value		
	Mean (S.D)	Paired t test & p value	Mean (S.D)	Paired t test & p value	
Physiological Variables					
Weight	8.33 (2.06)	22.193 P=0.000***	-1.45 (2.15)	P=0.001***	t = 18.061 p = 0.000 ***
BMI	3.63 (0.82)	t=24.312 p=0.000 ***	-0.61 (0.97	t= 3.437 p=0.002 **	t = 18.320, p= 0.000 ***
SBP	8.33 (4.57)	t= 9.979 p=0.000 ***	0.60 (5.70)	t=0.577 p= 0.568 (N.S)	t = 5.798, p= 0.000 ***
DBP	2.30 (7.44)	t=1.693 p=0.101 (N.S)	1.47 (10.08)	t= 0.797 p= 0.432 (N.S)	t = 0.364, p= 0.717 (N.S)
Psychological Variables					
Depression	8.83 (4.34)	t= 11.149 p=0.000 ***	-1.10 (4.17)	t=1.444 p= 0.159 (N.S)	t = 9.038, p= 0.000 ***
Anxiety	7.37 (4.00)	t= 10.077 p=0.000 ***	-0.27 (2.16)	t= 0.675 p= 0.505 (N.S)	t = 9.185, p= 0.000 ***
Stress	9.43 (5.48)	t= 9.426 p=0.000 ***	-2.70 (3.15)	t= 4.690 p= 0.000 ***	t = 10.509, p= 0.000 ***
Self-Esteem	12.97 (3.86)	t= 18.381 p=0.000 ***	-1.03 (2.32)	t= 2.433 p= 0.021 *	t = 17.001, p= 0.000 ***

Table 2: To be continued

Biochemical Variables					
T3	0.01 (33.11)	t= 0.001 p=0.999 (N.S)	4.69 (36.33)	t= 0.707 p= 0.485 (N.S)	t = 0.522, p= 0.604 (N.S)
T4	0.21 (1.71)	t= 0.675 p=0.505 (N.S)	-0.82 (2.13)	t= 2.041 p=0.051(N.S)	t = 2.050, p= 0.045 *
TSH	3.31 (1.42)	t= 12.755 p=0.000 ***	-0.87 (3.13)	t= 1.526 p= 0.138 (N.S)	t = 6.662, p= 0.000 ***

Note: * - $p<0.05$, ** - $p<0.01$, *** - $p<0.001$. Level of Significance, N.S. – Not significant.

5. DISCUSSION

The present study demonstrates that a 16-week structured yoga intervention significantly improved both physiological and psychological parameters in women with early adulthood hypothyroidism. Key findings encompassed a statistically significant decrease in Thyroid-Stimulating Hormone (TSH) alongside a marginal rise in triiodothyronine (T3), suggesting a positive modulation of thyroid activity. BMI and blood pressure also showed significant decreases, suggesting better metabolic control and autonomic regulation. Psychological measures reflected substantial improvements, with marked reductions in depression, anxiety, and stress scores, along with increased self-esteem. These results are consistent with prior research, further substantiating the potential of yoga as an adjunctive therapy in the management of hypothyroidism and the enhancement of overall well-being. Overall, the results suggest that yoga can positively influence endocrine function and mental well-being in hypothyroid women. Further long-term studies are warranted to confirm these effects.

5.1 BIOCHEMICAL VARIABLES

5.1.1 THYROID STIMULATING HORMONE (TSH)

Women with early adulthood hypothyroidism often present with elevated TSH levels, indicating reduced thyroid function. In the present study, yoga practices significantly reduced TSH levels, suggesting improved hormonal balance through modulation of the hypothalamic-pituitary- thyroid (HPT) axis. Similar reductions in TSH following yoga interventions have been reported by [13,14], highlighting yoga's potential role in improving thyroid regulation.

5.1.2 T3 & T4

In hypothyroid women, low T3 and T4 levels reflect impaired thyroid hormone activity. The current findings showed improvement in T4 levels and a positive trend in T3; however, changes in T3 were not statistically significant, suggesting the need for a longer intervention period or increased intensity of practice. These changes

indicate enhanced thyroid function and potentially better peripheral changes of T4 to T3. Comparable improvements in T3 and T4 have been reported by [14] after yoga interventions, supporting its role in thyroid health management.

5.2 PHYSIOLOGICAL VARIABLE

5.2.1 BLOOD PRESSURE

Women in early adulthood with hypothyroidism are predisposed to hypertension due to hormonal imbalance, stress, and autonomic dysfunction. This study observed reductions in systolic blood pressure after yoga intervention, with more pronounced changes in the experimental group compared to controls. The findings indicate that consistent yoga training potentially reduces blood pressure through mechanisms involving stress mitigation and improved autonomic nervous system balance. Similar findings were reported in a previous study [11], which demonstrated reduced blood pressure in individuals with endocrine-related disorders following consistent yoga practice.

5.2.2 BMI

Weight gain and elevated BMI are common in hypothyroidism due to decreased metabolic rate and hormonal dysregulation. In the present study, BMI significantly decreased in the yoga group, while minimal change was observed in controls, indicating that regular yoga practice supports healthy weight management. These results are consistent with prior research showing significant BMI reduction and improved adipokine profiles following yoga and pranayama interventions in obese, hypertensive, hypothyroid patients [12].

5.3 PSYCHOLOGICAL VARIABLES

5.3.1 DEPRESSION

Depression is frequently associated with hypothyroidism due to neuroendocrine imbalances and chronic fatigue. The present findings revealed a marked reduction in depression scores in the yoga practices group, while the compare the control group showed negligible change. This suggests that yoga fosters emotional stability and psychological well-being. Rani et al. [12] similarly reported a significant decrease in depression among hypothyroid women following regular yoga practice.

5.3.2 ANXIETY

Anxiety symptoms are common in hypothyroidism, often linked to hormonal disturbances and low energy levels. Participants in the yoga group demonstrated notable reductions in anxiety compared to controls. Breathing techniques and relaxation practices within yoga likely contributed to calming the nervous system and reducing psychological tension. These findings align with [12], who reported significant anxiety reduction in hypothyroid women after yoga interventions.

5.3.3 STRESS

Hypothyroidism-related stress is often exacerbated by metabolic and emotional strain. The current study found a significant decline in stress levels in the yoga group, with minimal change in controls. This supports the role of pranayama and meditation in activating the parasympathetic nervous system, promoting relaxation, and improving stress resilience. Similar outcomes were reported in prior studies [12].

5.3.4 SELF-ESTEEM

Low self-esteem in hypothyroid women may result from physical symptoms, fatigue, and mood disturbances. In this study, self-esteem improved substantially in the yoga group. This suggests that consistent regular yoga practice enhances self-worth, body awareness, and emotional resilience. [15] reported comparable improvements in self-esteem among women with hypothyroidism following regular yoga practice.

6. CONCLUSION

The present study demonstrated that yoga practices produced significant improvements in both physiological and psychological variables among women with early adulthood hypothyroidism. The 16-week intervention resulted in notable reductions in blood pressure, BMI, body weight, and TSH levels, along with increases in T4 levels and a positive trend in T3, indicating enhanced thyroid regulation. Psychological outcomes, including depression, anxiety, and stress, showed significant decreases, while self-esteem improved substantially. These results indicate that yoga can serve as an effective, non-pharmacological, mind–body intervention to complement conventional management of hypothyroidism, thereby enhancing overall health, emotional resilience, and quality of life in affected women.

7. RECOMMENDATION

- Future studies should include male participants and individuals across different age groups to assess the wider applicability of yoga interventions in managing hypothyroidism-related health issues.
- Future studies with more participants will better prove yoga's benefits for hypothyroidism.
- Further research could compare different forms of yoga (e.g., traditional yoga, yoga combined with Pranava mantra chanting, and integrated yoga therapy) to determine their relative effectiveness on thyroid function, metabolic health, and psychological well-being.
- Conducting longitudinal studies will help evaluate the sustainability of benefits from yoga practice and its role in preventing recurrence or worsening of hypothyroidism-related symptoms.

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9. ANNEXURES

9.1 LIST OF PUBLICATIONS

1. Mohanapriya P, Dr. Desigamani K, Dr. Usha K, Dr. Manimekalai, Dr. Shanmugapriya (2024). EFFECTIVENESS OF YOGA PRACTICES ON BODY MASS INDEX AND SELF-CONFIDENCE AMONG EARLY ADULTHOOD HYPOTHYRODISM WOMEN. African journal of biological sciences, 14(6).
2. Pandiyan, M., Kanniyappan, D., Govindasamy, K., Badri, K., Pramanik, M., Kambitta Valappil, I. N., ... & Geantă, V. A. (2025). Therapeutic Effects of Yoga on Physiological and Psychological Parameters in Women with Early Adulthood Hypothyroidism: A Randomized Controlled Trial. *Sport Mont*, *23*(1).
3. Pandiyan Mohanapriya, Kanniyappan Desigamani, Krishnan Baskaran, Kuppuswamy Usha, Velusamy Subbulakshmi, Narayanan Manimekalai, Natarajan Muninathan (2025) Role of Yoga Practice on Depression and Self-esteem among Women with Hypothyroidism. Pravara Medical Review.
4. Influence of yoga practices on depression and self-esteem among Tricennarian Hypothyroidism disorder.
5. The study of yoga therapy on psychological parameters in women with early adulthood Hypothyroidism: A Pilot study.

9.2 PROOF OF PUBLICATIONS

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EFFECTIVENESS OF YOGA PRACTICES ON BODY MASS INDEX AND SELF-CONFIDENCE AMONG EARLY ADULTHOOD HYPOTHYRODISM WOMEN

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INTRODUCTION

Thyroid gland is a one of the most important endocrine glands in our body. It has located in our throat region like butterfly shaped. There are two different types of thyroid disease: They are hypothyroidism (underactive) and hyperthyroidism(overactive). Hypothyroidism means the thyroid gland will not secretes an enough of thyroid hormone it will call as hypothyroidism. This is the second most common endocrine disorder in the world. Iodine is the main fuel of thyroid hormone, if insufficient of iodine in your food diet it will leads to hypothyroidism. There are two types of cells in thyroid gland. (1) Follicular cells that produce T3 Triiodothyronine and T4 Thyroxine. (2) Parafollicular cells has produces calcitonin for the production of thyroid hormone. The main functions of thyroid hormone have produces body metabolism. The function of metabolism food transform into the energy to the body. Thyroid hormone has controlled your body temperature and heart rate. Pituitary gland has controlled by the bloodstream in thyroid hormone. In hypothalamus Anti-Pituitary gland has stimulate TSH thyroid stimulating hormone. TSH has release T4 & T3 will form and iodine and thyroxin will join then the thyroid gland will secret properly. If you start practicing Yoga it will help to balances the secretes of thyroid hormone properly and you get relax physically and mentally.

DOI 10.26773/smj.250219

SportMont

ORIGINAL SCIENTIFIC PAPER

Therapeutic Effects of Yoga on Physiological and Psychological Parameters in Women with Early Adulthood Hypothyroidism: A Randomized Controlled Trial

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Abstract

Hypothyroidism is a common endocrine disorder impacting metabolic, cardiovascular, and psychological health in women. While conventional management emphasizes pharmacological treatments, yoga offers potential as a complementary intervention for addressing multisystemic complications. To evaluate the efficacy of a 16-week yoga intervention on thyroid function, body composition, cardiovascular parameters, and psychological well-being among women with early adulthood hypothyroidism. This prospective, randomized, controlled, single-blind parallel-group trial included 60 women aged 20–39 with hypothyroidism. Participants were randomized into yoga (n=30) and control (n=30) groups. The yoga group underwent five weekly 90-minute sessions incorporating asanas, pranayama, meditation, and mindfulness techniques for 16 weeks. Outcome measures included thyroid function markers (TSH, T3, T4), anthropometric measurements (BMI), cardiovascular parameters (systolic and diastolic blood pressure), and psychological assessments (Depression, Anxiety, and Stress Scale [DASS], self-esteem scores). The yoga group showed significant ($p<0.05$) improvements: TSH decreased by 1.1 mIU/L, T3 increased by 0.2 nmol/L, BMI reduced by 1.7 kg/m^2, systolic and diastolic blood pressure dropped by 8 mmHg and 6 mmHg, respectively (both), DASS scores declined by 9.4 points, and self-esteem scores increased by 5.3 points. In conclusion, yoga demonstrated moderate-to-large effect sizes ($d=0.54–1.12$) across endocrine, cardiovascular, and psychological outcomes, underscoring its value as a holistic, non-pharmacological approach for managing hypothyroidism. Additionally, the sustained benefits observed across multiple health domains highlight yoga's potential to improve long-term quality of life and reduce the risk of associated comorbidities in women with early adulthood hypothyroidism.

Keywords: *hypothyroidism, yoga intervention, thyroid function, body composition, cardiovascular health, psychological well-being*

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To

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Subject: Final acceptance letter

Thank you for manuscript submission entitled **"Role of Yoga Practice on Depression and Self-esteem among Women with Hypothyroidism"**

Our Editorial Board is very pleased to inform you that said manuscript is **finally accepted** for publication in PMR in our forthcoming issue, SEPTEMBER 2025.

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CERTIFICATE OF APPROVAL

Study Reference Number	:	MAHER/IEC/ PhD/34/FEB24
Project Title	:	A STUDY ON YOGA PRACTICES ON SELECTED PHYSIOLOGICAL AND PSYCHOLOGICAL VARIABLES AMONG EARLY ADULTHOOD HYPOTHYROIDISM DISORDER WOMEN
Date of Approval (Valid for four years)	:	22/04/2024
Nature of the Project	:	PHD RESEARCH
Principal Investigator	:	P.MOHANA PRIYA
Designation	:	Ph.D. SCHOLAR
Co-Investigator/s	:	NA
HOD/Supervisor	:	DR.K.DESIGAMANI
Department	:	YOGA

On behalf of Institutional Ethics Committee of MAHER, we hereby give approval in respect to the undertaking submitted for the above mentioned project. The investigator may therefore commence with the research as from the date of this certificate, using the reference number indicated above.

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Member Secretary, IEC
Date: 24.05.2024

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Annexure A

PLAGIARISM VERIFICATION CERTIFICATE

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Annexure A

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Session : June 2022.
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